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Emma Martin

*James Madison University*

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# USING RESIDENTIAL LOCATION TO ASSESS THE ENVIRONMENTAL VALUE-ACTION GAP OF STUDENTS AT JAMES MADISON UNIVERSITY

Emma Martin



## ABSTRACT

This study focuses on the environmental value-action gap of students at James Madison University (JMU) in Harrisonburg, Virginia. An environmental value-action gap occurs when a person has pro-environmental beliefs but does not have congruent actions. Over 1,000 JMU students completed a survey of their residence location, environmental values, and environmental actions. Students' preservation and utilization values were assessed using a 2-Dimensional Model of Ecological Values (2-MEV), and their frequency of environmental actions was assessed through a series of Likert-scaled statements. It was hypothesized that any value-action gap would be wider in students who resided in off-campus housing compared to students who resided in on-campus housing, due to on-campus students' proximity to the university's numerous green initiatives. Instead, the data showed that off-campus students had higher mean value and action scores than on-campus students, although a value-action gap did exist in both populations. Additionally, there was a moderate correlation between the values and actions within both groups, indicating that stronger values might lead to more frequent actions. The results of this study can help enhance green initiatives at JMU and other universities.

James Madison University (JMU) is a public university located in Harrisonburg, Virginia, with nearly 20,500 students. The university projects increased enrollment (Office of Institutional Research, 2017) and intends to continue to support academic programs related to STEM and environmental sustainability (James Madison University, 2017). As the number of students living in Harrisonburg increases, the university will face greater pressure to maintain and improve its sustainable practices. The JMU Environmental Stewardship Action Plan outlines an array of university-wide sustainability practices. Several are already in place: accessible alternative transportation, Leadership in Energy and Environmental Design gold and silver certified buildings, partnerships with local farms to supply food to dining halls, and waste composting (James Madison University, n.d.; The Office of Environmental Stewardship, 2016). However, despite the university's work to encourage sustainability and positive environmental action, even students strongly in favor of protecting the environment and conserving resources may not always follow through on their values. This possible value-action gap occurs because other factors influence students' environmentally-supportive behavior (Howell, 2013).

The purpose of this study is to determine if location is a factor that affects students' actions regarding the environment and then to assess whether a value-action gap exists at JMU. Location has the potential to motivate pro-environmental behavior because proximity to green initiatives is assumed to produce a higher frequency of pro-environmental action. Pro-environmental action is defined as any behavior that protects or encourages the protection of the environment and its resources (Liefländer & Bogner, 2014; Malandrakis, Boyes, & Stanisstreet, 2011). Understanding the diffusion of environmental behavior from on-campus living to off-campus living is important because the majority of a JMU student's residency is often off-campus. It is hypothesized that on-campus students participate in pro-environmental actions more frequently than off-campus students because on-campus students live and study amid campus-wide sustainability initiatives, and that they therefore have a smaller value-action gap.

## Literature Review

### Environmental Attitudes

Studies have been conducted to better understand the factors that affect students' attitudes toward the environment (Boyes & Stanisstreet, 2012; Hebel, Montpied, & Fontanieu, 2014; Liefländer & Bogner, 2014; Malandrakis et al., 2011; Wiseman & Bogner, 2003). Hebel, Montpied, and Fontanieu (2014) studied the link between students'

environmental attitudes and their interest in learning about environmental topics, environmental extracurricular activities, and value priorities for their future careers. They determined that students who are interested in learning about the environment as well as students who are involved in nature-related extracurricular activities show higher levels of concern for the environment. On the other hand, students whose career goals involve "earning lots of money," "controlling other people," or "becoming famous" tend to have more apathetic views toward the environment. Other studies have shown that efficacy plays a major role in whether or not a person participates in environmental actions. Students who feel their behavior actually impacts the environment in a positive manner are more likely to continue this behavior (Boyes & Stanisstreet, 2012; Malandrakis et al., 2011).

Attitude research often uses a 2-Dimensional Model of Ecological Values (2-MEV) questionnaire to keep results comparable between studies (Liefländer & Bogner, 2014). A 2-MEV questionnaire, first proposed by Wiseman and Bogner (2003), assesses respondents' ecological values on two orthogonal dimensions: the biocentric dimension (Preservation) and the anthropocentric dimension (Utilization). A biocentric view holds that it is important to take care of the environment whereas an anthropocentric view holds that it is acceptable for humans to utilize the environment to their advantage. The orthogonal aspect of this model is important because it states that preservation and utilization are mutually exclusive and not correlated. A high preservation (PRE+) score and a low utilization (UT-) score means that the person cares about the environment and believes in conservation. PRE- UT+ means that the person uses the environment for personal gain and does not care much about conservation. In contrast, PRE- UT- is associated with someone who is generally uninterested in environmentalism, and PRE+ UT+ reflects someone who is spontaneously dissonant and easily able to switch positions (Wiseman & Bogner, 2003).

### Age

Few studies concentrate on students in higher education, as survey respondents in the literature range from 9-15 years old. Liefländer and Bogner (2014) found that younger students are considered more impressionable and therefore more easily influenced to care about the environment. In contrast, Hebel et al. (2014) found that older students in the 9-15 age range have a greater understanding of the context associated with environmental issues. The current study focuses on college students, as this population is positioned to immediately promote and practice environmental conservation and sustainability after graduation.



## Location

Much of the research on the link between location and the value-action gap is on a global scale (e.g., the annual Greendex survey conducted by the National Geographic Society and GlobeScan). This scope makes it difficult to act on results at a local level, such as college campuses. A study of the environmental knowledge, attitudes, and behaviors of Chinese university students more closely relates to the purposes of the present study in its sample population and spatial component (Tiefenbacher, He, Hong, & Liu, 2011). The research provides some insight into the relationship between developed versus less-developed hometowns and environmental awareness. Results showed low overall environmental knowledge but did identify pro-environmental attitudes and a propensity for eco-friendly behavior. Students from developed regions showed slightly greater environmental knowledge and more positive environmental attitudes than those from less-developed regions, despite their similar educations.

The distinction between urban and less urban students in Tiefenbacher, He, Hong, and Liu (2011) can serve as a starting point for analyzing any value-action gap among JMU students. Off-campus living locations vary in their development, with the JMU campus in many ways the most developed area. If JMU is considered an urban center, then the hypothesis that on-campus students participate in more green initiatives due to their proximity to these initiatives aligns with the results of the Tiefenbacher et al. study. Nonetheless, the need for more research into the relationship between location and the potential value-action gap at JMU is apparent.

Existing literature has mostly sought to understand what factors influence values and then to determine if these values lead to more frequent actions. In contrast, the present study seeks to understand how a single factor—location—influences values and actions almost as two distinct concerns. Rather than seeing if location influences beliefs, which then influences actions, this study attempts to determine if there are differences in students' values in each zone and in students' actions in each zone, and ultimately to determine if and where there is a value-action gap.

## Methods

To determine whether environmental beliefs and behaviors vary among students living on campus and off campus, an IRB-approved (16-0239) Qualtrics survey was administered. This approach preserved respondents' anonymity and prevented responses from being associated with individual respondents. The survey was sent through the JMU bulk email system to all 20,297 students enrolled in the university. Students under the age of 18 were not permitted

to participate. Prospective participants were informed in the initial bulk email and in the research consent form that 50 people who completed the survey would be randomly selected to receive cookies from Campus Cookies, a well-known local bakery. A total of 1,004 students—a response rate of 4.9%—completed the survey's three sections.

## Demographics

The survey's first section asked about participants' gender, age, year in college, major, and where they lived in Harrisonburg. To collect spatial data without asking for identifiable information, an interactive ArcGIS online map was embedded in the survey. The map followed major roads in dividing Harrisonburg into seven zones with an additional eighth zone for residents living outside of Harrisonburg (Figure 1). Participants were directed to search for their Harrisonburg address to determine in which zone they lived. Participants living outside of Harrisonburg could select the closest town from a given list.

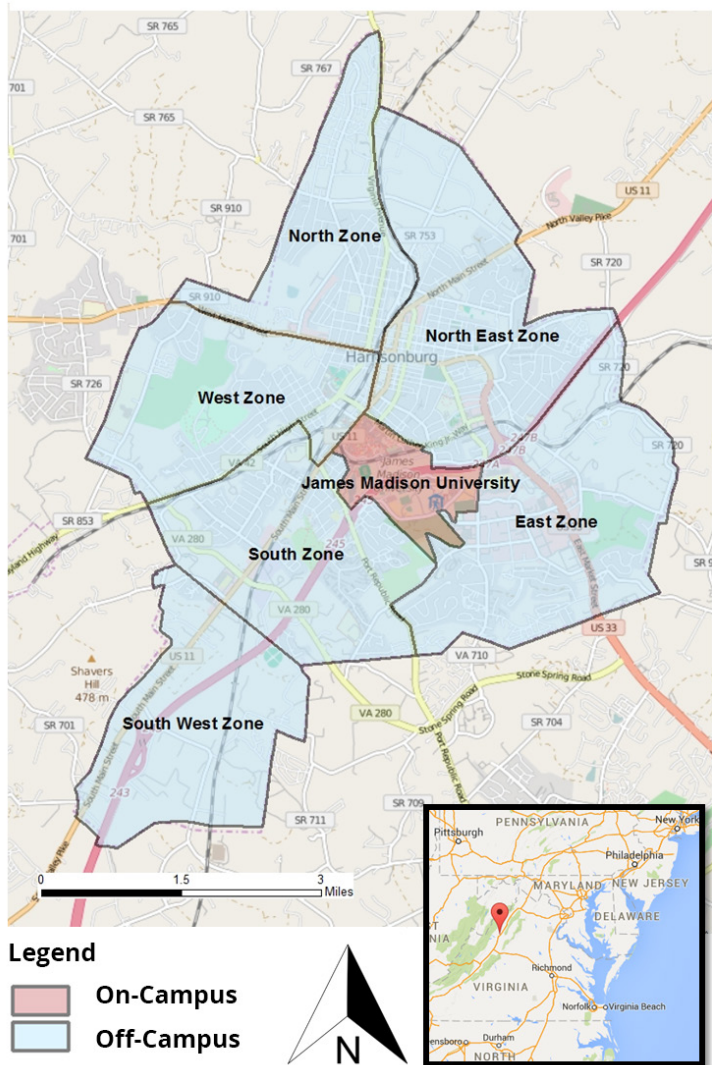


Figure 1. Map showing the eight on- and off-campus zones in and around Harrisonburg, Virginia. The non-Harrisonburg zone is not labeled.

## Values

The second section of the survey assessed participants' environmental beliefs using Likert-scaled statements. This part of the survey design was based on the methodologies of Hebel et al. (2014) and Boyes and Stanisstreet (2012) and utilized a 2-Dimensional Model of Ecological Values (2-MEV) questionnaire. The purpose of using this methodology was to make the results of the present study comparable to the results of other studies that have used a 2-MEV test. Additionally, a 2-MEV analysis that identified whether JMU students view the world in biocentric or anthropocentric terms could allow for more targeted on- or off-campus environmental initiatives.

The 2-MEV section consisted of eight preservation statements and six utilization statements (Table 1). Statements in this section were developed from comparable surveys (Boyes & Stanisstreet, 2012; Hebel et al., 2014; Malandrakis et al., 2011) and pertained to environmental values about which the average JMU student could have an opinion. Participants were prompted to indicate how strongly they agreed or disagreed with each environmental belief on a 5-point Likert scale ranging from *Agree* to *Disagree* with a *No Opinion* option. Preservation statements were designed such that *Agree* indicated the strongest pro-environmental belief whereas utilization statements were designed such that *Disagree* designated the strongest pro-environmental belief. To account for this difference, Likert scale responses for the preservation statements were assigned different numbers (*Disagree* = 1, *Slightly Disagree* = 2, *No Opinion* = 3, *Slightly Agree* = 4, *Agree* = 5) than the utilization statements (*Agree* = 1, *Slightly Agree* = 2, *No Opinion* = 3, *Slightly Disagree* = 4, *Disagree* = 5). Reversing the numbering scale made it easier to aggregate scores for each section as a whole, and to perform ANOVA and Pearson's correlation tests for the values and actions data. Utilization scores were not reversed for the 2-MEV analysis to keep the results consistent with comparable studies. The preservation and utilization subcategories identified in italics in the Table 1 Value Statements column were not disclosed to participants.

## Actions

The survey's final section evaluated students' environmental behaviors. Fourteen statements related to environmental actions were chosen such that each action statement corresponded to a similar statement in the values section, similar to the methodology of Boyes and Stanisstreet (2012). For example, the action statement "Investigate new ways to protect the environment" paired with the value statement "It is important to learn about new ways to protect the environment" (Table 1). The idea was to determine whether participants' values correlated with their ongoing actions and thus whether a value-action gap existed. Action statements were divided into seven subcategories of typically surveyed environmental behaviors: recycling, recreation,

transportation, energy consumption, participation in green events, water consumption, and responsible consumerism (Boyes & Stanisstreet, 2012; Hebel et al., 2014; Malandrakis et al., 2011; Stone, 2014). Participants were directed to indicate how often they performed each action using a 4-point Likert scale—*Never* = 1, *Occasionally* = 2, *Often* = 3, *Always* = 4. The seven environmental behavior subcategories identified in italics in the Table 1 Action Statements column were not disclosed to participants.

# Results

## Demographics

Nearly 41% of students who participated in the survey lived on campus while 59% lived off campus. South zone and East zone had the greatest number of off-campus respondents at 208 and 200 respectively. The average participant age was 20.25 years old. On-campus respondents had the lowest mean age, 19.02, which makes sense as over 90% of 2015-2016 freshmen lived on campus and nearly 90% of 2015-2016 non-freshmen lived off campus (Office of Institutional Research, n.d.). Participants in the non-Harrisonburg zone had the highest mean age at 25.15, which again makes sense as older students are more likely to be returning to school and commuting from outside of Harrisonburg. On-campus students had the lowest average number of years completed at JMU at 1.54, while students in off-campus zones averaged between 3.0 and 3.28. Across all zones, there was a relatively even spread of responses from each academic level: Freshman (28%), Sophomore (22%), Junior (22%), and Senior (28%).

## Values

**ALL ZONES.** The overall values score for all survey participants is 4.22 out of a possible 5, which indicates that respondents as a whole had strong pro-environmental beliefs. The mean preservation score for the sample population as a whole is 4.51, indicating a strong biocentric view and an affinity for environmental protection. The mean utilization score is 2.06 out of 5, indicating a non-anthropocentric view with some feelings against consumption of environmental resources.

Figure 2 shows that utilization scores are less polarized than preservation scores. Figure 2 also shows the overall strong affinity of JMU students for pro-environmental beliefs. At least 80% of participants reported that they *Slightly Agree* or *Agree* with the eight preservation statements, or *Slightly Disagree* or *Disagree* with three of the six utilization statements. "It is a good thing to turn off the lights when they are not needed" (Statement 4) produced the strongest response with 98% of students choosing *Slightly Agree* or *Agree*. "There is no need to reduce, reuse or recycle because humans are meant to use nature for their own benefit" (Statement 12) garnered the second strongest response with 96.6% of students choosing *Slightly Disagree* or *Disagree*.

**Table 1**

Value and Action Statement Pairs Used in the Qualtrics Survey Distributed to JMU Students.

| Statement Number | Value Statements  | Action Statements  |
|------------------|---|--|
| 1                | It is important to learn about new ways to protect the environment. <i>preservation</i>                                       | Investigate new ways to protect the environment. <i>participation in green events</i>  |
| 2                | I would volunteer to help clean up the environment. <i>preservation</i>   | Participate in “green” events, such as Blacks Run CleanUp Day. <i>participation in green events</i>  |
| 3                | It is a good thing to try to help others understand that nature is important. <i>preservation</i>                             | Help others understand the impact their actions have on the environment (i.e., encouraging friends to recycle). <i>participation in green events</i> |
| 4                | It is a good thing to turn off the lights when they are not needed. <i>preservation</i>                                       | Turn the lights off when they are not needed. <i>energy consumption</i>  |
| 5                | Taking the bus, walking or riding a bike decreases a person’s energy consumption. <i>preservation</i>                         | Walk or bike rather than taking the bus. <i>transportation</i>   |
| 6                | It helps the environment to eat locally grown food. <i>preservation</i>   | Eat locally grown food. <i>responsible consumerism</i>   |
| 7                | It is important to go outside and enjoy nature as much as possible. <i>preservation</i>                                       | Spend time outside for fun. <i>recreation</i>  |
| 8                | Listening to the sounds of nature is an enjoyable experience. <i>preservation</i>   | Notice the sounds of nature. <i>recreation</i>   |
| 9                | There is no need to conserve water because there is so much water. <i>utilization</i>   | Turn off the water when brushing your teeth. <i>water consumption</i>  |
| 10               | Recycling does not do enough good to make up for the harm we cause the environment. <i>utilization</i>                        | Buy recycled products. <i>responsible consumerism</i>  |
| 11               | If I throw away plastic bottles, it will not make a big difference because I am only one person. <i>utilization</i>           | Separate recyclables from garbage. <i>recycle</i>  |
| 12               | There is no need to reduce, reuse or recycle because humans are meant to use nature for their own benefit. <i>utilization</i> | Drink from a reusable water bottle. <i>water consumption</i>   |
| 13               | I use air conditioning whenever possible. <i>utilization</i>  | Open the windows rather than turn on the air conditioning. <i>energy consumption</i>   |
| 14               | Understanding which items should be put in compost, recycling and landfill bins takes too much time. <i>utilization</i>       | Sort trash into proper receptacle (i.e., compost, landfill, etc.). <i>recycle</i>  |

(Note: Respondents did not see the italicized value and action subcategory identified below each statement.)



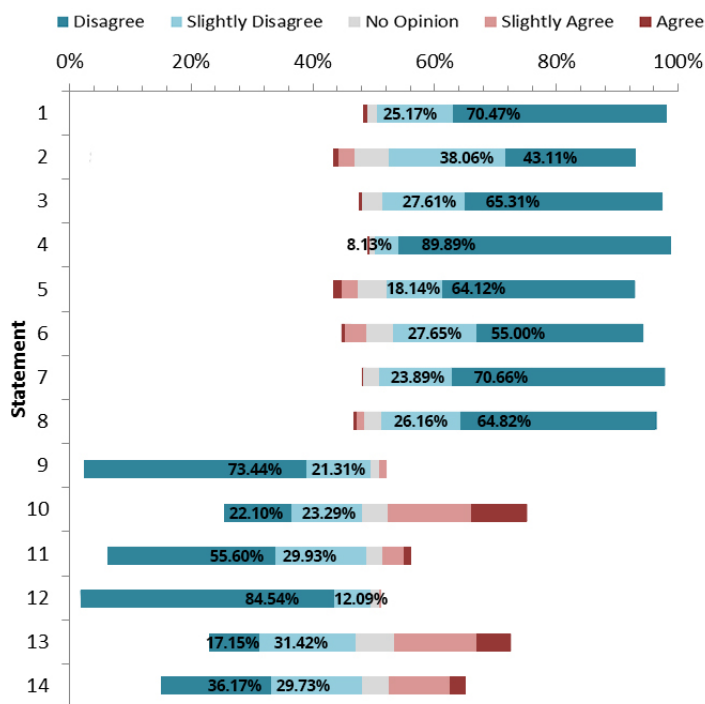


Figure 2. Distribution of scores for all survey responses to the 14 value statements.

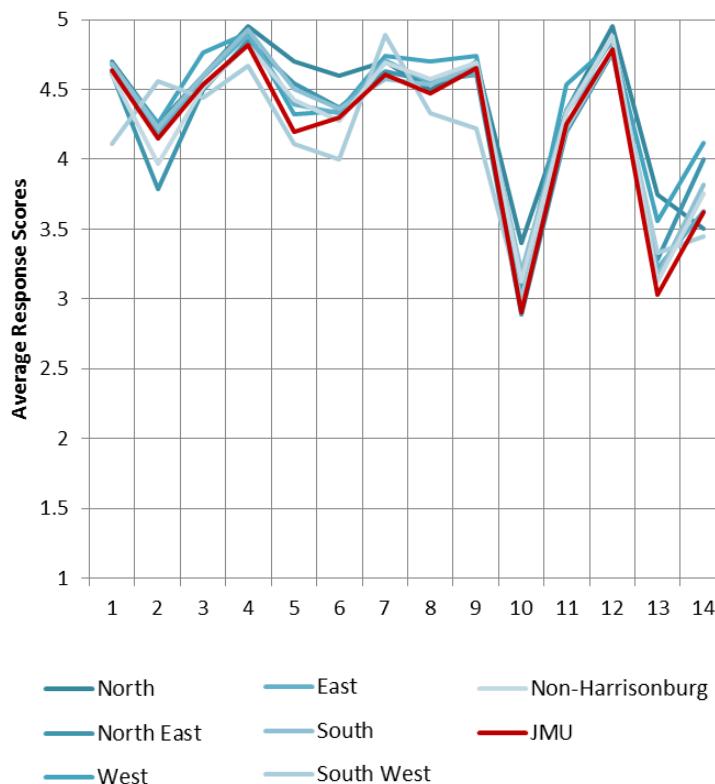


Figure 3. Average responses for the 14 value statements in the eight on- and off-campus zones.

Three statements produced less definitive responses. Only 51.4% of students reported that they *Slightly Agree* or *Agree* with Statement 13: “I use air conditioning whenever possible.” Similarly, 54.7% of students reported that they *Slightly Disagree* or *Disagree* that “Recycling does not do enough good to make up for the harm we cause the environment” (Statement 10). The only other statement that did not indicate strong beliefs was “Understanding which items should be put in compost, recycling and landfill bins takes too much time” (Statement 14). That respondents split nearly evenly in their responses to these three statements indicates clear divisions in the JMU community.

**ON-CAMPUS ZONE V. COMBINED OFF-CAMPUS ZONES.** Off-campus students reported stronger pro-environmental beliefs than on-campus students. An Analysis of Variance (ANOVA) test shows the difference between the combined off-campus value scores (4.3) and the on-campus value scores (4.21) to be statistically significant ( $p \leq 0.05$ ). The ANOVA also identifies significant differences in responses to Statements 5, 10, 13, and 14. The difference in mean response scores for all other value statements is less than 0.09, but the difference for these four statistically significant outliers ranges from 0.16 to 0.58, which shows that on- and off-campus students are more divided on these values.

**ON-CAMPUS ZONE V. INDIVIDUAL OFF-CAMPUS ZONES.** Figure 3 shows the mean responses for the 14 value statements in each of the eight on- and off-campus zones. The mean responses from the off-campus zones follow a similar trend with minimal deviations from the on-campus zone responses

highlighted in red. The ANOVA test for each statement is inaccurate at determining statistically significant variation between the on-campus zone and the individual off-campus zones. For example, Statement 5—“Taking the bus, walking, or riding decreases a person’s energy consumption”—is one of two statements that show significant variance, as the South zone mean (4.5) is 0.3 higher than the on-campus zone mean (4.2). However, there are even greater variations that the ANOVA does not specify. For example, the North zone has a mean of 4.7 for this statement, a difference of 0.5. The smaller sample size for the North zone ( $N = 22$ ) in comparison to the South zone ( $N = 208$ ) may have altered the ANOVA test results. These uneven sample sizes mean that the analysis cannot be deemed conclusive.

**2-MEV ANALYSIS.** The on-campus zone has a mean PRE score of 4.47 and a mean UT score of 2.13, while the off-campus zones are at 4.53 and 2.00. Because the UT Likert scale was not inverted for the 2-MEV analysis, lower UT scores indicate a more environmentally protective response. The 2-MEV ANOVA comparing PRE and UT value scores for the on-campus zone and the combined off-campus zones indicates that the means are statistically different and better in both cases for the off-campus zones as a whole.

Figure 4 shows the 2-MEV comparison of the on-campus zone and each of the seven off-campus zones. The greatest difference in average PRE score is between the on-campus

zone (4.47) and the North zone (4.63), which reported stronger biocentric and protective environmental values than any other zone. The lowest PRE score, and therefore the least concerned with preservation, is for the Southwest zone (4.39). For UT, the greatest difference is between the on-campus zone (2.13) and the West zone (1.86). The West zone reported the lowest, and therefore least anthropocentric, utilization beliefs. The highest, or least pro-environmental, UT score is for the Southwest zone. The North zone has the greatest gap between the two scores (PRE = 4.63, UT = 1.89). In other words, the North zone reported the strongest combination of biocentric values and non-anthropocentric values.

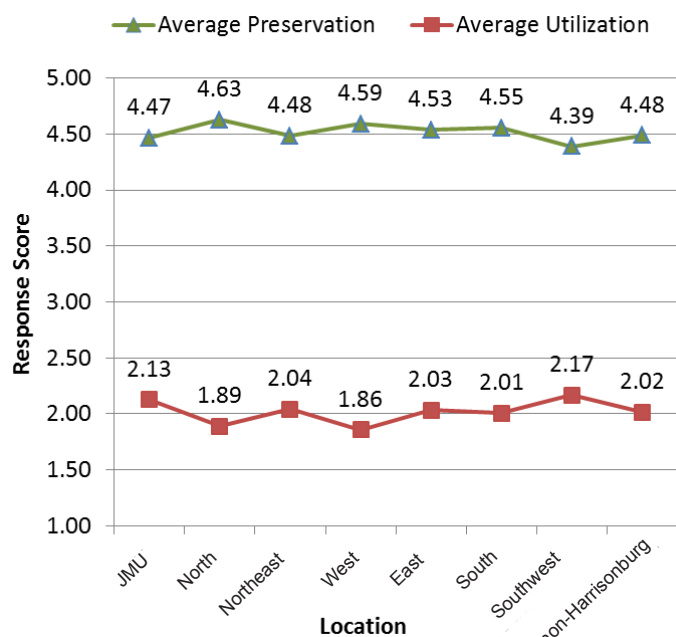


Figure 4. 2-MEV comparison of average preservation and average utilization scores for respondents in all eight on- and off-campus zones.

## Actions

**ALL ZONES.** The mean actions score for all survey participants is 2.76 out of 4, which means that respondents as a whole reported engaging in pro-environmental behavior more than *Occasionally* (2) and slightly less than *Often* (3). As shown in Figure 5, less than 50% of participants responded *Often* or *Always* for five of the 14 action statements. Statement 2 had the lowest frequency of action with 11.1% of students indicating they *Often* or *Always* “Participate in green events, such as BlacksRun CleanUp Day.” Only 24.7% of students indicated they *Often* or *Always* “Investigate new ways to protect the environment” (Statement 1). “Eat locally grown food” (Statement 6), “Help others understand the impact their actions have on the environment (i.e., encouraging friends to recycle)” (Statement 3), and “Buy recycled products” (Statement 10) also had less than half of students responding *Often* or *Always*, with 36%, 40.8%, and 48.2%, respectively.

More than 80% of all respondents chose *Often* or *Always* for three action statements. The action that students reporting performing the most was “Turn the lights off when they are not needed” (Statement 4) with 94.5% of students responding *Often* or *Always*. “Drink from a reusable water bottle” (Statement 12) and “Turn off the water when brushing your teeth” (Statement 9) also garnered strong responses, with 84.4% and 83.1% of students responding *Often* or *Always*, respectively.

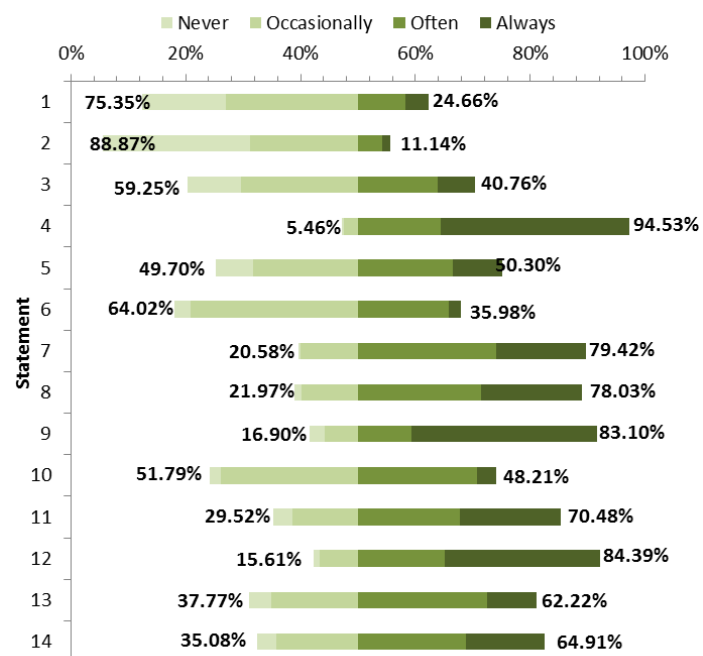


Figure 5. Distribution of scores for all survey responses to the 14 action statements. The numbers on the left indicate the percent of respondents who selected *Never* or *Occasionally*, while the numbers on the right indicate the percent of respondents who selected *Often* or *Always*.

**ON-CAMPUS ZONE V. COMBINED OFF-CAMPUS ZONES.** The overall Actions Section mean for all off-campus respondents is 2.90, while the Actions Section mean for on-campus respondents is 2.64. In other words, in addition to reporting stronger pro-environmental values, off-campus students reported that they perform pro-environmental actions more frequently than on-campus students. The ANOVA test between on-campus responses and combined off-campus responses for the actions section indicates a statistically significant difference. The ANOVA also identifies significant differences for Statements 4, 12, 5, and 14. Off-campus students reported that they “Turn the lights off when they are not needed” (Statement 4) and “Drink from a reusable water bottle” (Statement 12) more often than on-campus students. However, on-campus students reported that they “Walk or bike rather than taking the bus” (Statement 5) and “Sort trash into proper receptacle (i.e., compost, landfill, etc.)” (Statement 14) more than off-campus students.



**ON-CAMPUS ZONE V. INDIVIDUAL OFF-CAMPUS ZONES.** Figure 6 shows the mean responses for the 14 action statements in the eight on- and off-campus zones. As in Figure 3, the mean responses from the off-campus zones follow a similar trend with minimal deviations from the on-campus zone responses highlighted in red. The ANOVA test shows variance in the data for Statements 4, 5, and 14, which is consistent with the Actions Section: Combined Zones results except for Statement 12. Tukey's comparison test indicates that for the statement "Turn the lights off when they are not needed" (Statement 4), the East zone and the South zone have higher means than the on-campus zone. The higher scores on this statement for the two off-campus zones are consistent with the combined off-campus to on-campus ANOVA comparison. On the other hand, the on-campus zone's mean for "Walk or bike rather than taking the bus" (Statement 5) is higher than the Northeast and South zone means. The on-campus zone's mean for "Sort trash into proper receptacle (i.e., compost, landfill, etc.)" (Statement 14) is also higher than the East zone's mean. These results are again consistent with the the combined off-campus to on-campus ANOVA comparison.

**SUBCATEGORIES.** Figure 7 shows the mean action scores for on- and off-campus responses in the seven environmental behavior subcategories. The subcategory with the highest average response score for both locations is water

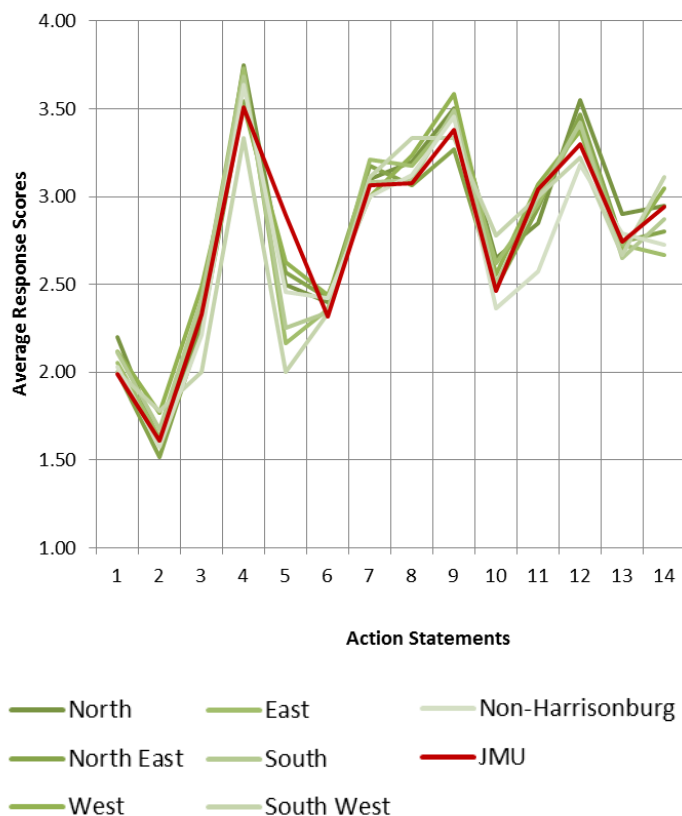


Figure 6. Average responses for the fourteen action statements in the eight on- and off-campus zones.

consumption, followed by energy consumption. There is no statistically significant difference between average scores in all subcategories except for transportation, which has an average score of 2.9 for the on-campus zone and 2.3 for the combined off-campus zones.

## Value-Action Gap

A Pearson's correlation was calculated for each pair of value and action statements. The correlation produces a p-value that indicates whether or not a correlation exists and a number between -1 and 1 to evaluate the strength of the correlation. The strength of the absolute value of each coefficient was evaluated using the following scale: .00-.19 = *Very Weak*, .20-.39 = *Weak*, .40-.59 = *Moderate*, .60-.79 = *Strong*, .80-1.0 = *Very Strong*. The closer the correlation is

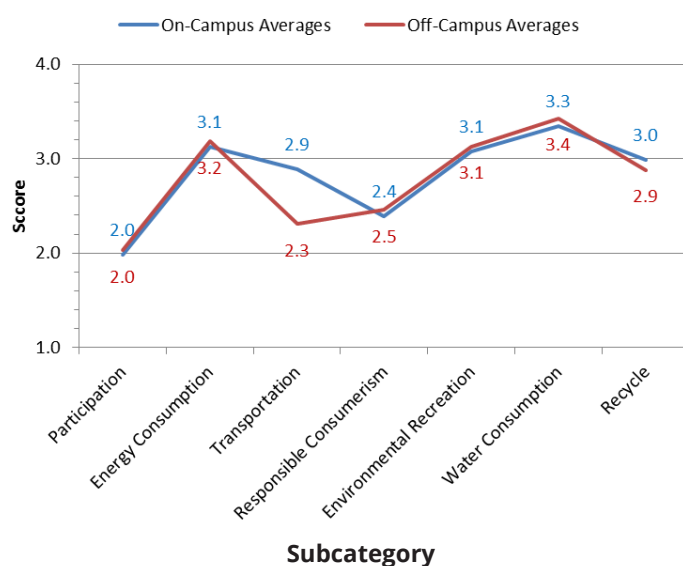







Figure 7. Average action scores for on- and off-campus responses in each of the seven environmental behavior subcategories.

to 1.0, the smaller the value-action gap. Table 2 shows the correlation between value and action statements for "All Zones," "On-Campus Zone" and "Off-Campus Zones." While there are moderate correlations between values and actions responses for all zones, the on-campus zone, and the combined off-campus zones, there are no statistically significant differences.

For "All Zones" the strongest correlations are between Statement pairs 7, 8, and 13, indicating that JMU students as a whole reported acting on their values related to spending time outside and reducing air conditioning use more than they reported acting on their values for other statements. The weakest correlations are for Statement pairs 9, 10, and 12, indicating that students did not often report acting on their strong values related to conserving water, recycling, and minimizing waste.

**Table 2**

*Correlation Between Each Pair of Value and Action Statements for All Zones, the On-campus Zone, and All Off-campus Zones.*

 No Correlation
  Very Weak
  Weak
  Moderate
  Overall Correlation

| Value Statement   | Action Statement   | All Zones Correlation | On-Campus Zone Correlation | Off-Campus Zones Correlation |
|---|--|-----------------------|----------------------------|------------------------------|
| 1. It is important to learn about new ways to protect the environment   | Investigate new ways to protect the environment  | 0.31                  | 0.32                       | 0.31                         |
| 2. I would volunteer to help clean up the environment   | Participate in “green” events, such as Blacks Run CleanUp Day  | 0.35                  | 0.34                       | 0.36                         |
| 3. It is a good thing to try to help others understand that nature is important                               | Help others understand the impact their actions have on the environment (i.e., encouraging friends to recycle) | 0.36                  | 0.37                       | 0.35                         |
| 4. It is a good thing to turn off the lights when they are not needed   | Turn the lights off when they are not needed   | 0.32                  | 0.04                       | 0.35                         |
| 5. Taking the bus, walking or riding a bike decreases a person’s energy consumption                           | Walk or bike rather than taking the bus  | 0.03                  | 0.01                       | 0.02                         |
| 6. It helps the environment to eat locally grown food   | Eat locally grown food   | 0.29                  | 0.24                       | 0.32                         |
| 7. It is important to go outside and enjoy nature as much as possible   | Spend time outside for fun   | 0.44                  | 0.40                       | 0.46                         |
| 8. Listening to the sounds of nature is an enjoyable experience   | Notice the sounds of nature  | 0.54                  | 0.51                       | 0.57                         |
| 9. There is no need to conserve water because there is so much water  | Turn off the water when brushing your teeth  | 0.17                  | 0.16                       | 0.19                         |
| 10. Recycling does not do enough good to make up for the harm we cause the environment                        | Buy recycled products  | 0.08                  | 0.05                       | 0.09                         |
| 11. If I throw away plastic bottles it will not make a big difference because I am only one person            | Separate recyclables from garbage  | 0.30                  | 0.28                       | 0.21                         |
| 12. There is no need to reduce, reuse or recycle because humans are meant to use nature for their own benefit | Drink from a reusable water bottle   | 0.13                  | 0.13                       | 0.12                         |
| 13. I use air conditioning whenever possible  | Open the windows rather than turn on the air conditioning  | 0.45                  | 0.43                       | 0.47                         |
| 14. Understanding which items should be put in compost, recycling and landfill bins takes too much time       | Sort trash into proper receptacle (i.e., compost, landfill, etc.)  | 0.36                  | 0.41                       | 0.34                         |
|   |  | 0.57                  | 0.56                       | 0.58                         |

The on-campus and off-campus zones show no difference in correlation except for Statement pairs 4, 10, and 14. There is no correlation for the on-campus zone for Statement 4 between the value and action statements related to turning off the lights when they are not needed, whereas the off-campus zone shows a weak correlation. This means that there is no relationship between on-campus students' beliefs and behaviors when it comes to lights, while off-campus students' higher beliefs might result in more frequent actions. Additionally, there is no relationship between belief in the efficacy of recycling and buying recycled products (Statement 10) for the on-campus zone while there is a very weak relationship for the off-campus zones. Lastly, the relationship between identifying recyclables and compostables and acting on this value (Statement 14) is weaker for the off-campus zones than for the on-campus zone.

## Discussion

### Value-Action Gap

Several results indicate a value-action gap in students at James Madison University as a whole. First, the percent of participants who chose environmentally favorable value responses is better defined and more concentrated than the percent of participants that chose environmentally favorable action responses. Figure 2 shows the distribution of all survey responses for the values section. More than 50% of respondents chose the most pro-environmental response, *Agree* for the preservation statements and *Disagree* for the utilization statements, for 10 of the 14 statements. In contrast, more than 50% of respondents selected *Always* for only three of the 14 action statements (Figure 5). The disparity suggests that participants had stronger pro-environmental values and less committed actions. The gap is even more apparent when considering that at least 80% of participants selected *Agree* or *Slightly Agree* for all eight preservation statements and *Disagree* or *Slightly Disagree* for three of the six utilization statements. In contrast, at least 80% of participants selected *Always* or *Often* for only two of the 14 action statements.

Another measure of the value-action gap is the correlation between value statements and their corresponding action statements. Table 2 shows a moderate correlation for all zones, the on-campus zone, and the combined off-campus zones. In other words, strong pro-environmental values did not always relate to more frequent pro-environmental behavior. This is consistent with the definition of a value-action gap (Howell, 2013). Additionally, because the difference between on-campus and off-campus correlation is not statistically significant, one location does not have a larger value-action gap than another. That is to say, it does not seem that location is a factor that affects the size of the size of JMU students' value-action gap.

Some value and action statement pairs do have stronger correlations at one location than another. For example, Table 2 shows that there is no correlation between values and actions for Statement pair 4, relating to turning off the lights, for the on-campus zone, but there is a weak correlation for the off-campus zones. This means that people who live off campus and believe it is important to turn off the lights when they are not needed are more likely to do so. The same can be said for Statement pair 14, which relates to sorting waste. Other statistically significant differences occur between the on-campus zone and the off-campus zones—for example, Statement pair 10, which relates to the efficacy of recycling—but the variation in responses between the on-campus and off-campus zones (0.04) is not significant. In other words, a difference of 0.04 does not offer strong evidence of real-world variation. In sum, although location might not affect the value-action gap for all statements as whole, there are location-dependent variations in the size of the gap for different subcategories (e.g., responsible consumerism and recycling).

Moreover, there is significant difference in the size of the value-action gap when comparing the correlations of different statements. For example, there is less of a gap for Statement pairs 7, 8, and 13, which relate to recreation and energy consumption, than for Statement pairs 1, 2, 3, 6, and 11, which relate to participation in green events, responsible consumerism, and recycling. The weakest correlations—and thus the largest value-action gaps—are for Statement pairs 5, 9, and 12, which relate to transportation and water consumption.

### Actions Section Subcategories

Figure 7 shows that two subcategories with low scores are transportation and responsible consumerism (Statements 5, 6, and 10). Figure 7 also shows that participation in green events (Statements 1, 2, and 3) was significantly the weakest subcategory. Table 2 shows that subcategories related to participation in green events and environmental recreation (Statements 1, 2, 3, 7, and 8) have weak or moderate correlation. These results support the work of Hebel et al. (2014), who found that behaviors that include interest in learning about the environment and participation in extracurricular activities correlate with pro-environmental beliefs.

### Efficacy

Based on the Pearson's correlation for Statement pair 10, there is no relationship between belief in the efficacy of recycling and the act of buying recycled products (Statement 10) for on-campus respondents, while there is a very weak relationship for off-campus respondents. However, the difference between on-campus respondents and off-campus respondents is not significant. This result does not support



findings by Boyes and Stanisstreet (2012) and Malandrakis et al. (2011), who found that belief in the efficacy of a pro-environmental action increases the likelihood of that action.

## Values and Actions

Despite there not being a difference in the size of the value-action gap between the on- and off-campus zones, Figure 8 shows that respondents in off-campus zones did have stronger overall values and actions. The four action statements on which off-campus students scored higher (Statements 4, 9, 12, and 13) indicate strong conservation in the water consumption and energy consumption subcategories. These actions may have been motivated by off-campus students' desire to pay less for utilities, while on-campus students cannot influence utility costs built into their room and board fees. Similarly, off-campus students' significantly higher PRE scores and lower UT scores in the 2-MEV analysis could be rooted in the factor of financial awareness. Off-campus students' higher mean age could also be a factor. Finally, on-campus students' pro-environmental responses for Statement 5 (transportation) and Statement 11 (recycling) could be because they walk to classes, cannot have cars, use the city transit system around town, and use the recycling and compost bins located in on-campus buildings. This result is especially interesting because it suggests that on-campus sustainability initiatives are proving effective.

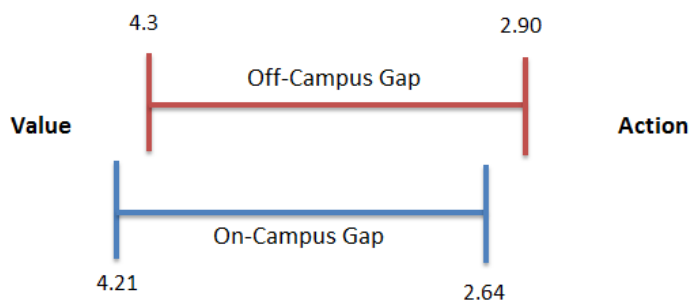


Figure 8. Visualization of the value-action gap with location considered as a factor. Numbers on the left indicate mean value scores while numbers on the right indicate mean action scores.

## Conclusions

Previous studies have found that motivators such as peer influence (Carrico, 2009), efficacy (Boyes & Stanisstreet, 2012; Malandrakis et al., 2011), and education (Hebel et al., 2014) inform environmental values and actions. In most instances, this literature seeks to understand what factors influence values and then to determine if these values lead to more frequent actions. In the process, it underemphasizes the importance of understanding the values and actions of students in higher education and does not engage location

as a possible factor. The present study has attempted to address these gaps in method and focus by examining university students' environmental values and actions on their campus and in their immediate community

The present study does not establish location as a direct motivator for change in values and action in the way that peer influence or education is, nor does it find that location influences the size of the value-action gap. It was hypothesized that any value-action gap would be wider in students who resided in off-campus housing compared to students who resided in on-campus housing, due to on-campus students' proximity to the university's numerous green initiatives. For example, the JMU campus offers resources, classes, alternative transportation, and recycling in close proximity to on-campus students' actual place of residence. By contrast, off-campus locations are not in as close in proximity to these green behavior support systems. Instead, the stronger values and actions exhibited by off-campus students contradict the initial hypothesis that on-campus students are more likely to engage in pro-environmental behavior because they are in closer proximity to green initiatives.

## Limitations

The methodology that guided this project does not assume that values directly influence actions. Rather, it seeks to understand how the factor of location influences values and actions individually and then attempts to determine if there are differences at each location. One key constraint on this approach came in the time allotted for participants to complete the survey. In order to make sure the survey would consume no more than five minutes, the values and actions sections were limited to 14 statements each. As a result, on the values side of the survey, there were eight preservation statements and only six utilization statements; similarly, on the actions side, the transportation subcategory had only one statement while the participation in green events subcategory had three. Future research could normalize data by evening out the statements in each value and action subcategory and adding a greater variety of environmental behaviors and actions.

A second limitation was the uneven number of students who responded from each zone, which made the ANOVA comparing results from the eight on- and off-campus zones inconclusive. For example, the Southwest zone only had nine completed responses while the on-campus zone had 409. This disparity could explain why the Southwest zone scored poorly in the 2-MEV analysis with the lowest preservation score and the highest utilization score. Future research could focus on achieving even sample sizes from each zone to provide more statistically significant evidence about students' values and actions.

## Implications and Directions

The present study can offer directions forward for green initiatives at JMU and other university campuses:

- An environmental value-action gap does exist for both on-campus students and off-campus students.
- There is a moderate correlation between the values and actions within both groups, indicating that stronger values might lead to more frequent actions.
- Students have stronger pro-environmental values and less committed actions. The percent of participants who chose environmentally favorable value responses is better defined and more concentrated than the percent of participants that chose environmentally favorable action responses.
- Location is a factor when considering the strength of students' environmental values and actions as well as the 2-MEV for each location. Off-campus students had higher mean values and actions score than on-campus students.
- There are location-dependent variations in the size of the gap for different subcategories (e.g., responsible consumerism and recycling).
- There are significant differences in the size of the value-action gap when comparing the correlations of different statements (e.g., a smaller gap for recreation and energy consumption and a relatively larger gap for transportation and water consumption).

At the conclusion of this study, all data was stored with the JMU Office of Environmental Stewardship and Sustainability in a password protected file, and OESS intends to deploy the survey annually. Looking forward, the survey and surveys like it will need to be modified both to normalize data and to achieve more consistently significant results. In the process, now that location has been determined not be a strong stimulus, researchers could act to better understand the differences between the on- and off-campus gaps as well as the location-dependent variations in the size of the gap for different subcategories.

It is possible that location encompasses a number of different factors that might act simultaneously on students. Put differently, locations that have the greatest influence on a person's environmental behaviors might have a number of characteristics that make it easier to perform actions. Additional study would be needed to determine what characteristics Harrisonburg residential locations have and how these characteristics work together to impact students' beliefs and behaviors. For example, why do off-campus students have higher value and action scores than on-campus students? Are financial resources the underlying

factor that causes off-campus students to conserve energy and water resources?

Do higher age or academic year correlate to stronger beliefs or more frequent behaviors? Based on the difference in mean age between on-campus and non-Harrisonburg respondents (19.02 and 25.15), researchers could consider how students' age informs their values and actions in comparison to younger students. A similar analysis could be performed to understand the influence of number of years of higher education and majors and career goals on behavior and belief. The difference in mean completed years of college at JMU between respondents in the on-campus zone (1.54) and respondents in all off-campus zones (3.2) could be a starting point for determining whether education is an influential factor. Additional research could associate students' majors and career goals with their response scores.

Alternatively, researchers could focus in on specific weak or strong subcategories and could work to better understand what factors actually do motivate students' pro-environmental actions. Why does the size of the value-action gap at JMU depend more on action—or inaction—than on values, and why are JMU students more likely to act on their values regarding recreation and energy consumption than they are for green events, responsible consumerism, recycling, transportation, and water consumption? Has JMU been more successful in investing students in some of its initiatives than others? Could JMU develop additional interventions that target specific behaviors.

These options—focusing more broadly on multiple motivators or more specifically on individual action subcategories—offer promising directions forward as researchers and planners interested in on-campus and community sustainability initiatives work to reduce JMU students' value-action gap.

# Author's Note



Emma Martin ('16) earned her BS in Geographic Science, graduating as a member of Phi Beta Kappa. Ms. Martin's *JMURJ* "Environmental Value-Action Gap" article condenses her Honors thesis of the same title, which she presented at the American Association of Geographers Annual Meeting in San Francisco in 2016; Ms. Martin's work was also featured on the JMU Office of Environmental Stewardship Tour site.

Ms. Martin is currently working toward her MS in Environmental Sciences at Arkansas State University, where she serves as a graduate assistant in the Ecotoxicology Research Facility. Her Master's thesis research focuses on the relationship between vegetative coverage and water quality in two agriculturally dominated ditch systems in northeast Arkansas, with attention to the biodiversity of macroinvertebrates, reptiles, amphibians, and birds.

Ms. Martin enjoys birding, herping, plant identification, Settlers of Catan, and playing with her beloved cats. She plans to study amphibian ecotoxicology in the context of water quality.

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